Vaillant

climaVAIR

Technical Dossier

WALL MOUNTED UNITS

VAM 2-050 W2N
VAM 2-060 W2N
VAM 2-085 W3N
VAM 2-110 W4N

2010

ENG

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2- TECHNICAL SPECIFICATIONS

Model			VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N
	Indoor unit 1		VAI 2-025 WNI	VAI 2-025 WNI	VAI 2-025 WNI	VAI 2-025 WNI
	Indoor unit 2		VAI 2-025 WNI	VAI 2-035 WNI	VAI 2-025 WNI	VAI 2-025 WNI
	Indoor unit 3		\	\	VAI 2-035 WNI	VAI 2-025 WNI
	Indoor unit 4		\	\	\	VAI 2-035 WNI
	Outdoor unit		VAF 2-060 W2NO	VAF 2-060 W2NO	VAF 2-085 W3NO	VAF 2-085 W4NO
Power supply	V/Ph/Hz					
Cooling capacity		kW	5,20	5,40	8,10	9,10
		BTU	17.747	18.429	27.644	31.056
		Fg/h	4.472	4.644	6.966	7.826
Capacity by Indoor	Indoor 1	kW	2,60	2,42	2,43	2,15
	Indoor 2	kW	2,60	2,98	2,43	2,15
	Indoor 3	kW	/	/	3,24	2,15
	Indoor 4		/	/	/	2,65
Power input		kW	1,62	1,66	2,48	2,78
Power input by Indoor	Indoor 1	kW	0,81	0,74	0,77	0,66
	Indoor 2	kW	0,81	0,92	0,77	0,66
	Indoor 3	kW	/	/	0,94	0,66
	Indoor 4	kW	/	/	/	0,80
Min - Max cooling capacity		kW	2.18 - 6.34	2.27 - 6.53	3.40 - 9.80	3.73 - 11.09
Min - Max cooling power input		kW	0.65 - 1.99	0.66 - 2.04	0.99 - 3.06	1.11 - 3.75
Nominal capacity (UK condit)		kW	5,15	5,35	8,02	9,00
Power input (UK conditions)		kW	1,30	1,33	1,98	2,22
Operating current		A	7,00	7,20	10,80	12,10
EER			3,21	3,25	3,27	3,27
Energy level class			A	A	A	A
Annual consumption		kWh	810	830	1.240	1.390
Heating capacity		kW	6,10	6,25	9,05	10,10
		BTU	20.818	21.330	30.886	34.469
		Kcal/h	5.246	5.375	7.783	8.686
Capacity by Indoor	Indoor 1	kW	3,05	2,82	2,71	2,38
	Indoor 2	kW	3,05	3,43	2,71	2,38
	Indoor 3	kW	/	/	3,63	2,38
	Indoor 4		/	/	/	2,96
Power input		kW	1,67	1,73	2,49	2,78
Power input by Indoor	Indoor 1	kW	0,84	0,78	0,77	0,66
	Indoor 2	kW	0,84	0,95	0,77	0,66
	Indoor 3	kW	/	/	0,95	0,66
	Indoor 4	kW	/	/	/	0,80
Min - Max heating capacity		kW	2.56 - 7.38	2.64 - 7.60	3.8 - 10.95	4.13 - 12.30
Min - Max heating power input		kW	0.67 - 2.06	0.69 - 2.11	1.0 - 3.07	1.11 - 3.72
Nominal capacity (UK condit)		kW	5,19	5,31	7,69	8,57
Power input (UK conditions)		kW	1,45	1,51	2,17	2,42
Operating current		A	7,30	7,50	10,80	12,10
COP			3,65	3,61	3,63	3,63
Energy level class			A	A	A	A
Max power input		kW	2,15	2,15	3,10	4,80
Max operating current		A	10,5	10,5	16,0	21,0

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2- TECHNICAL SPECIFICATIONS

INDOOR UNIT			VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N
Air flow volume		m3/h	250/300/500	250/300/500	250/300/500	250/300/500
		m3/h	250/300/500	310/450/580	250/300/500	250/300/500
		m3/h	/	/	310/450/580	250/300/500
		m3/h	/	/	/	310/450/580
Remote control type			Infrared	Infrared	Infrared	Infrared
Remote control reference			RG19B/E (white)	RG19B/E (white)	RG19B/E (white)	RG19B/E (white)
Sound power level	Indoor 1	dB(A)	40/45/51	40/45/51	40/45/51	40/45/51
	Indoor 2	dB(A)	40/45/51	41/47/52	40/45/51	40/45/51
	Indoor 3	dB(A)	/	/	41/47/52	40/45/52
	Indoor 4	dB(A)			/	41/47/52
Sound pressure level	Indoor 1	dB(A)	28/33/39	28/33/39	28/33/39	28/33/39
	Indoor 2	dB(A)	28/33/39	29/35/40	28/33/39	28/33/39
	Indoor 3	dB(A)	/	/	29/35/40	28/33/39
	Indoor 4	dB(A)	/	/	/	29/35/40
Catalogue sound pressure	Indoor 1	dB(A)	26/32/38	26/32/38	26/32/38	26/32/38
	Indoor 2	dB(A)	26/32/38	28/35/40	26/32/38	26/32/38
	Indoor 3	dB(A)	/	/	28/35/40	26/32/38
	Indoor 4	dB(A)			/	28/35/40
Testing conditions for sound pressure			microphone directivity,distance 1.0m			
Dimensions HxLxD	Indoor 1	mm	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200
	Indoor 2	mm	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200
	Indoor 3	mm	/	/	265 x 790 x 200	265 x 790 x 200
	Indoor 4	mm	/	/	/	265 x 790 x 200
Net weight	Indoor 1	Kg	8.5	8.5	8.5	8.5
	Indoor 2	Kg	8.5	8.5	8.5	8.5
	Indoor 3	Kg	/	/	8.5	8.5
	Indoor 4	Kg	/	/	/	8.5
Packaged dimensions HxLxD	Indoor 1	mm	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265
	Indoor 2	mm	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265
	Indoor 3	mm	/	/	335 x 875 x 265	335 x 875 x 265
	Indoor 4	mm			/	335 x 875 x 265
Volume	Indoor 1	m3	0,078	0,078	0,078	0,078
	Indoor 2	m3	0,078	0,078	0,078	0,078
	Indoor 3	m3	/	/	0,078	0,078
	Indoor 4	m3	/	/	/	0,078
Packaged weigth	Indoor 1	Kg	10,5	10,5	10,5	10,5
	Indoor 2	Kg	10,5	10,5	10,5	10,5
	Indoor 3	Kg	/	/	10,5	10,5
	Indoor 4	Kg	/	/	/	10,5

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2- TECHNICAL SPECIFICATIONS

OUTDOOR UNIT		VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N
Air flow volume	m3/h	2.500	2.500	2.500	3.500
Sound power level	dB(A)	62	62	64	65
Sound pressure	dB(A)	52	52	55	57
Number of fans		1	1	1	1
Refrigerant		R410A			
Refrigerant charge heat pump	gr	1450	1450	2000	2400
Inverter DC / AC		Inverter DC	Inverter DC	Inverter DC	Inverter DC
Number of compressors		1	1	1	1
Compressor type		Rotary	Rotary	Rotary	Rotary
Compressor Model		DA130S1C-20FZ	DA130S1C-20FZ	DA150S1C-20FZ	TNB220FLHMC-L
Compressor Brand		Toshiba	Toshiba	Toshiba	Mitsubishi
Expansion system		EXV + Capillary			
Electric_electronic protections		Voltage,current, communication protection			
Dimensions HxLxD	mm	695 x 845 x 315	695 x 845 x 315	695 x 845 x 315	862 x 895 x 305
Dimensions Valves A/B/C/F	mm	60/60/160/220	60/60/160/220	60/60/160/220	60/60/160/220
Dimensions Installation I/J	mm	335/560	335/560	335/560	330/590
Net weight	Kg	60,0	60,0	62,0	78,0
Packaged dimensions HxLxD	mm	770 x 970 x 400	770 x 970 x 400	770 x 970 x 400	915 x 1043 x 395
Volume		0,299	0,299	0,299	0,377
Packaged weight heat pump	Kg	64,0	64,0	66,0	82,0
INSTALLATION					
Pipe connection liq/gas Outdoor	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	\	1/4" - 3/8"
Pipe connection liq/gas Indoor	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	\	1/4" - 3/8"
PM (Max pressure)	bar	42	42	42	42
pm (min pressure)	bar	25	25	25	25
Max. L1+L2+(L3)	m	30	30	45	60
Max. L1	m	15	15	15	15
Max. Height IU under OU	m	10	10	10	10
Max. Height OU under IU	m	10	10	10	10
Chargeless length	m	7,5	7,5	7,5	7,5
Additional charge per meter	gr	15	15	15	15

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3- TEMPERATURE BY CAPACITIES

3.1 VAM 2-050 W2N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21ºC	25ºC	30ºC	35ºC	40ºC	45ºC	50ºC
21ºC D 15ºC W	Total capacity kW	5,27	5,10	4,89	4,64	4,41	4,17	3,82
	Sensitive capacity kW	4,22	4,08	3,91	3,71	3,53	3,34	3,05
	Input kW.	1,32	1,34	1,36	1,37	1,40	1,42	1,65
24ºC D 17ºC W	Total capacity kW	5,61	5,42	5,20	4,94	4,69	4,44	4,06
	Sensitive capacity kW	4,49	4,34	4,16	3,95	3,75	3,55	3,25
	Input kW.	1,45	1,47	1,49	1,51	1,53	1,55	1,81
27ºC D 19ºC W	Total capacity kW	5,90	5,71	5,47	5,20	4,94	4,67	4,27
	Sensitive capacity kW	4,72	4,57	4,38	4,16	3,95	3,74	3,42
	Input kW.	1,55	1,58	1,60	1,62	1,65	1,67	1,94
32ºC D 23ºC W	Total capacity kW	6,61	6,39	6,13	5,82	5,53	5,23	4,79
	Sensitive capacity kW	5,29	5,12	4,90	4,66	4,43	4,18	3,83
	Input kW.	1,77	1,79	1,82	1,84	1,87	1,90	2,21

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24ºC D 18ºC W	12ºC D 11ºC W	7ºC D 6ºC W”	4ºC D 3ºC W	0ºC D -1ºC W	-5ºC D -6ºC W	-7ºC D -8ºC W”	-15ºC D -16ºC W”
15ºC	Capacity kW	5,84	7,85	6,71	5,30	4,33	4,06	3,31	1,41
	Input kW.	1,84	2,22	1,80	1,62	1,52	1,51	1,49	1,30
18ºC	Capacity kW	5,57	7,49	6,41	5,06	4,14	3,88	3,16	1,35
	Input kW.	1,77	2,13	1,73	1,56	1,46	1,45	1,44	1,26
20ºC	Capacity kW	5,31	7,14	6,10	4,82	3,94	3,69	3,01	1,28
	Input kW.	1,70	2,05	1,67	1,50	1,41	1,40	1,38	1,21
22ºC	Capacity kW	5,09	6,85	5,86	4,62	3,78	3,55	2,89	1,23
	Input kW.	1,47	1,97	1,69	1,52	1,42	1,41	1,40	1,22
27ºC	Capacity kW	4,62	6,21	5,31	4,19	3,43	3,21	2,62	1,11
	Input kW.	1,79	2,16	1,76	1,58	1,48	1,47	1,46	1,27

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3- TEMPERATURE BY CAPACITIES

3.2 VAM 2-060 W2N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21ºC	25ºC	30ºC	35ºC	40ºC	45ºC	50ºC
21ºC D 15ºC W	Total capacity kW	5,47	5,29	5,07	4,82	4,58	4,33	3,96
	Sensitive capacity kW	4,38	4,24	4,06	3,86	3,66	3,46	3,17
	Input kW.	0,64	1,05	1,28	1,56	1,75	1,76	1,78
24ºC D 17ºC W	Total capacity kW	5,82	5,63	5,40	5,13	4,87	4,61	4,22
	Sensitive capacity kW	4,66	4,51	4,32	4,10	3,90	3,69	3,37
	Input kW.	0,65	1,08	1,32	1,61	1,80	1,82	1,84
27ºC D 19ºC W	Total capacity kW	6,13	5,93	5,68	5,40	5,13	4,85	4,44
	Sensitive capacity kW	4,90	4,74	4,54	4,32	4,10	3,88	3,55
	Input kW.	0,68	1,12	1,36	1,66	1,86	1,88	1,90
32ºC D 23ºC W	Total capacity kW	6,86	6,64	6,36	6,05	5,75	5,43	4,97
	Sensitive capacity kW	5,49	5,31	5,09	4,84	4,60	4,34	3,98
	Input kW.	0,75	1,23	1,50	1,83	2,05	2,07	2,09

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24ºC D 18ºC W	12ºC D 11ºC W	7ºC D 6ºC W"	4ºC D 3ºC W	0ºC D -1ºC W	-5ºC D -6ºC W	-7ºC D -8ºC W"	-15ºC D -16ºC W"
15ºC	Capacity kW	6,34	7,10	6,88	5,67	5,33	4,81	4,37	2,06
	Input kW.	0,62	1,29	1,87	1,88	1,68	1,37	1,27	0,96
18ºC	Capacity kW	6,05	6,78	6,56	5,41	5,09	4,59	4,17	1,97
	Input kW.	0,59	1,24	1,80	1,81	1,62	1,32	1,23	0,92
20ºC	Capacity kW	5,77	6,46	6,25	5,15	4,84	4,38	3,97	1,88
	Input kW.	0,57	1,19	1,73	1,75	1,56	1,27	1,18	0,89
22ºC	Capacity kW	5,54	6,20	6,00	4,95	4,65	4,20	3,81	1,80
	Input kW.	0,58	1,21	1,75	1,77	1,57	1,28	1,19	0,90
27ºC	Capacity kW	5,02	5,62	5,44	4,48	4,21	3,81	3,45	1,63
	Input kW.	0,58	1,22	1,77	1,79	1,59	1,30	1,21	0,91

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3- TEMPERATURE BY CAPACITIES

3.3 VAM 2-085 W3N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21ºC	25ºC	30ºC	35ºC	40ºC	45ºC	50ºC
21ºC D 15ºC W	Total capacity kW	8,21	7,94	7,61	7,23	6,87	6,50	5,95
	Sensitive capacity kW	6,57	6,35	6,09	5,79	5,50	5,20	4,76
	Input kW.	0,95	1,57	1,91	2,33	2,61	2,63	2,66
24ºC D 17ºC W	Total capacity kW	8,73	8,45	8,10	7,70	7,31	6,91	6,33
	Sensitive capacity kW	6,99	6,76	6,48	6,16	5,85	5,53	5,06
	Input kW.	0,98	1,62	1,97	2,40	2,69	2,72	2,75
27ºC D 19ºC W	Total capacity kW	9,19	8,89	8,52	8,10	7,70	7,27	6,66
	Sensitive capacity kW	7,35	7,12	6,82	6,48	6,16	5,82	5,33
	Input kW.	1,01	1,67	2,03	2,48	2,78	2,80	2,83
32ºC D 23ºC W	Total capacity kW	10,30	9,96	9,54	9,07	8,62	8,15	7,46
	Sensitive capacity kW	8,24	7,97	7,63	7,26	6,89	6,52	5,97
	Input kW.	1,11	1,84	2,24	2,74	3,06	3,09	3,13

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24ºC D 18ºC W	12ºC D 11ºC W	7ºC D 6ºC W"	4ºC D 3ºC W	0ºC D -1ºC W	-5ºC D -6ºC W	-7ºC D -8ºC W"	-15ºC D -16ºC W"
15ºC	Capacity kW	9,18	10,29	9,96	8,21	7,71	6,97	6,32	2,99
	Input kW.	0,89	1,85	2,69	2,71	2,42	1,97	1,83	1,38
18ºC	Capacity kW	8,77	9,82	9,50	7,84	7,36	6,65	6,03	2,85
	Input kW.	0,85	1,78	2,59	2,61	2,33	1,90	1,77	1,33
20ºC	Capacity kW	8,35	9,35	9,05	7,46	7,01	6,34	5,75	2,72
	Input kW.	0,82	1,72	2,49	2,51	2,24	1,83	1,70	1,28
22ºC	Capacity kW	8,01	8,98	8,69	7,16	6,73	6,08	5,52	2,61
	Input kW.	0,83	1,74	2,52	2,54	2,26	1,85	1,72	1,29
27ºC	Capacity kW	7,26	8,13	7,87	6,49	6,10	5,51	5,00	2,36
	Input kW.	0,84	1,76	2,55	2,57	2,29	1,87	1,74	1,31

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3- TEMPERATURE BY CAPACITIES

3.4 VAM 2-110 W4N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21ºC	25ºC	30ºC	35ºC	40ºC	45ºC	50ºC
21ºC D 15ºC W	Total capacity kW	9,22	8,92	8,55	8,13	7,72	7,30	6,68
	Sensitive capacity kW	7,38	7,14	6,84	6,50	6,18	5,84	5,34
	Input kW.	1,06	1,76	2,14	2,61	2,93	2,95	2,98
24ºC D 17ºC W	Total capacity kW	9,81	9,49	9,09	8,65	8,21	7,76	7,11
	Sensitive capacity kW	7,85	7,59	7,28	6,92	6,57	6,21	5,68
	Input kW.	1,10	1,81	2,21	2,69	3,02	3,05	3,08
27ºC D 19ºC W	Total capacity kW	10,33	9,99	9,57	9,10	8,65	8,17	7,48
	Sensitive capacity kW	8,26	7,99	7,66	7,28	6,92	6,54	5,98
	Input kW.	1,13	1,87	2,28	2,78	3,11	3,14	3,17
32ºC D 23ºC W	Total capacity kW	11,57	11,19	10,72	10,19	9,68	9,15	8,38
	Sensitive capacity kW	9,25	8,95	8,58	8,15	7,75	7,32	6,70
	Input kW.	1,25	2,06	2,51	3,07	3,44	3,47	3,50

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24ºC D 18ºC W	12ºC D 11ºC W	7ºC D 6ºC W”	4ºC D 3ºC W	0ºC D -1ºC W	-5ºC D -6ºC W	-7ºC D -8ºC W”	-15ºC D -16ºC W”
15ºC	Capacity kW	10,25	11,48	11,11	9,16	8,61	7,78	7,05	3,33
	Input kW.	0,99	2,07	3,00	3,03	2,70	2,20	2,05	1,54
18ºC	Capacity kW	9,78	10,96	10,61	8,75	8,22	7,42	6,73	3,18
	Input kW.	0,95	1,99	2,89	2,92	2,60	2,12	1,97	1,48
20ºC	Capacity kW	9,32	10,44	10,10	8,33	7,83	7,07	6,41	3,03
	Input kW.	0,92	1,92	2,78	2,81	2,50	2,04	1,90	1,43
22ºC	Capacity kW	8,94	10,02	9,70	8,00	7,51	6,79	6,16	2,91
	Input kW.	0,93	1,94	2,81	2,84	2,53	2,06	1,92	1,44
27ºC	Capacity kW	8,11	9,08	8,79	7,25	6,81	6,15	5,58	2,64
	Input kW.	0,94	1,96	2,85	2,87	2,56	2,09	1,94	1,46

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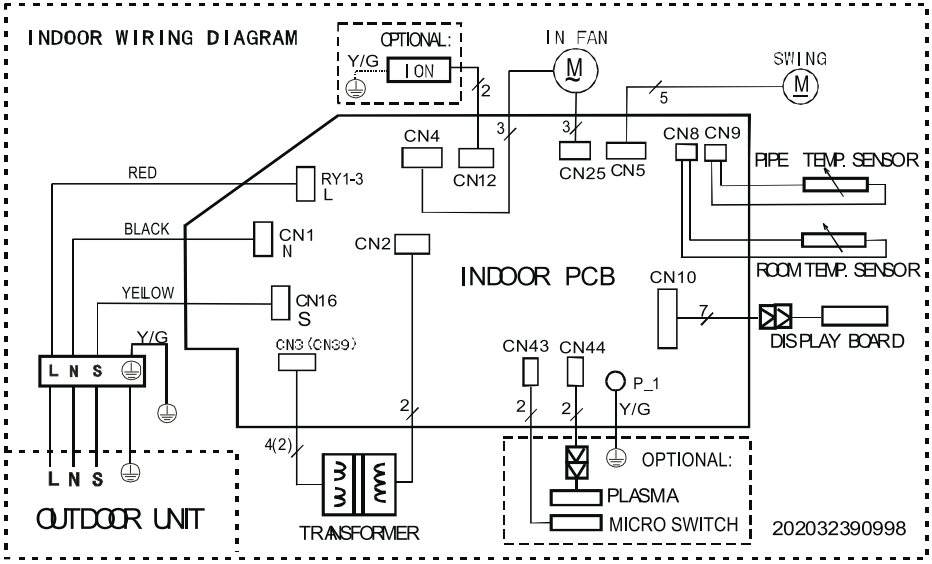
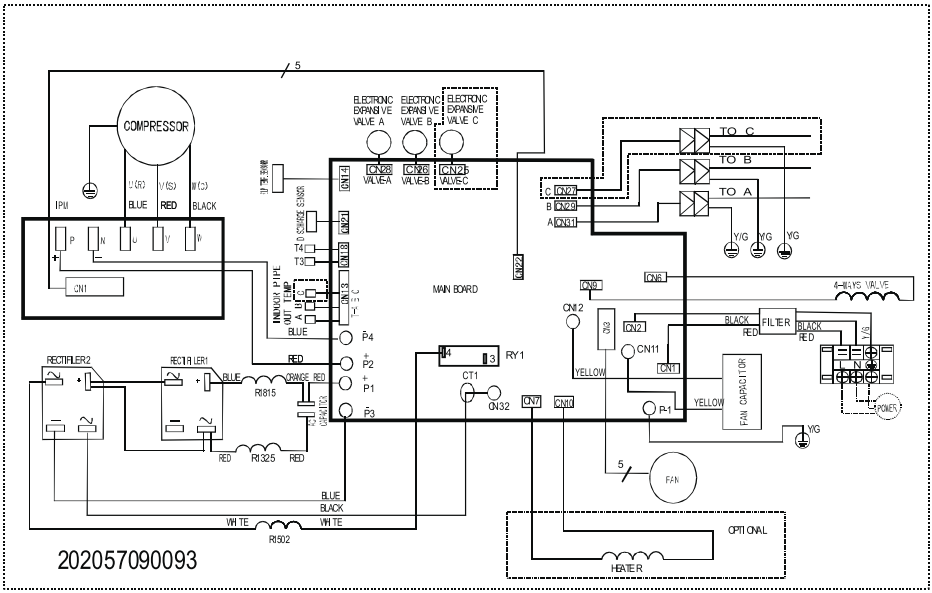
4- WIRING DIAGRAMS

Indoor units



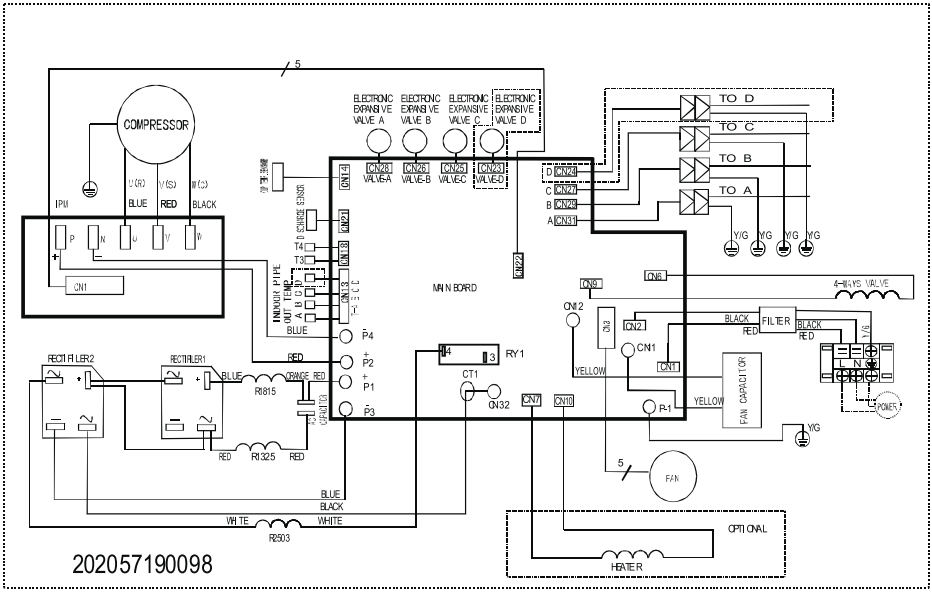
Outdoor unit Multi 1x2



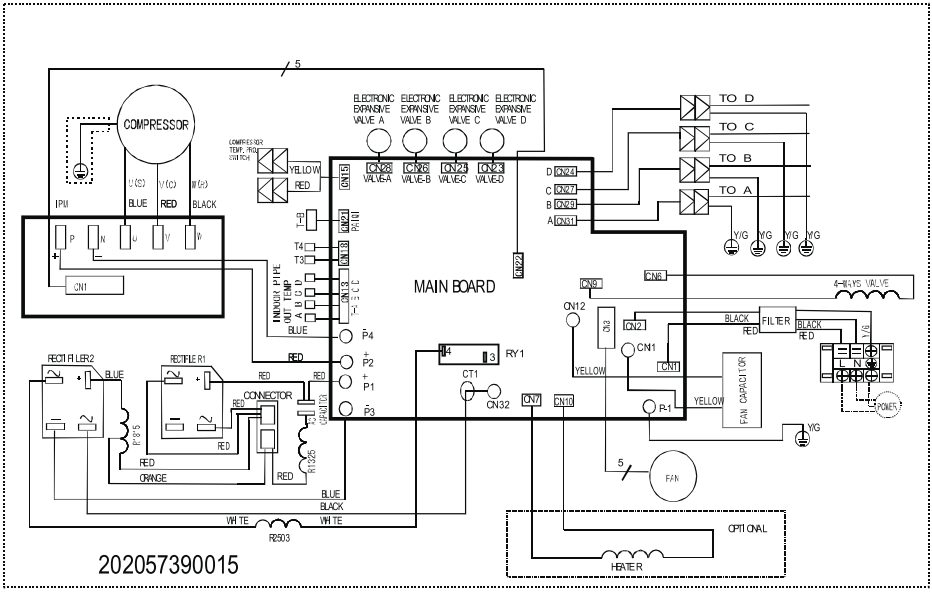
ENG

4- WIRING DIAGRAMS

Outdoor unit Multi 1x3



Outdoor unit Multi 1x4



ENG

5- ERROR CODES

Error Codes for indoor unit

Display	LED STATUS
E0	EEPROM error
E1	Communication error between indoor and outdoor unit
E2	Zero-crossing examination error
E3	Fan speed beyond control
E5	Outdoor units temp. sensor or connector of temp. sensor is defective
E6	Indoor units temp. sensor or connector of temp. sensor is defective
P0	Inverter module protection
P1	Outdoor voltage protection
P2	Compressor temp. protection
P3	Compressor current protection
P4	Inverter compressor drive error
P5	Mode conflict

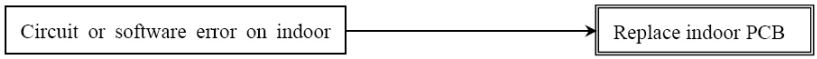
LED error code display for outdoor unit

Display	LED STATUS
E0	EEPROM error
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E6	No 4 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E4	Outdoor temp. sensor or connector of temp. sensor is defective
E5	Compressor volt protection
E7	Communication error between outdoor IC and DSP
P0	Compressor temp. protection
P1	High pressure protection (just for 27K and 36K 1x4 units.)
P2	Low pressure protection (just for 27K and 36K 1x4 units.)
P3	Compressor current protection
P4	Inverter module protection
P6	Condenser high-temperature protection
P7	Compressor driving protection

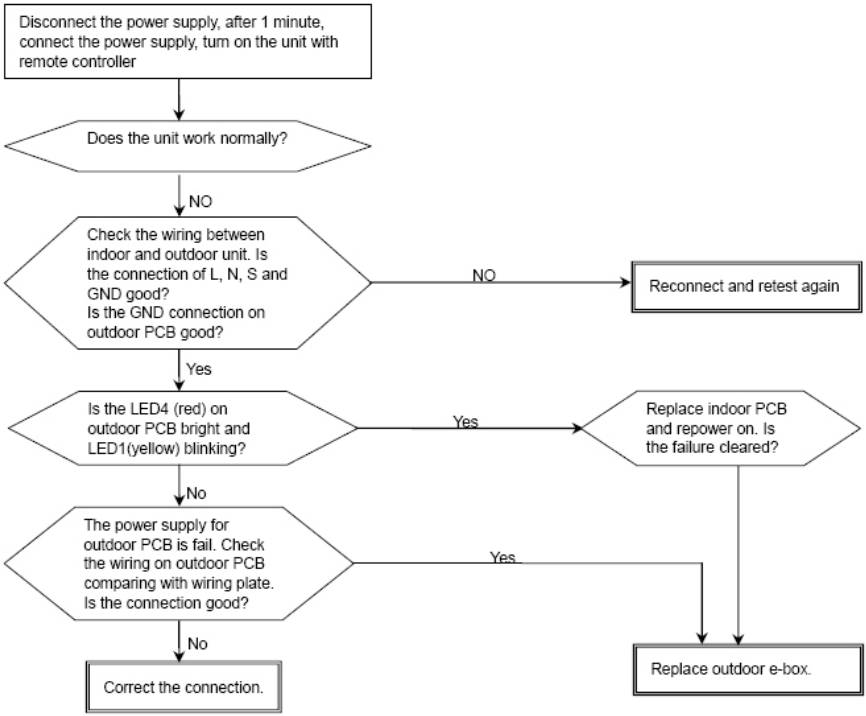
6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

6.1 INDOOR UNIT

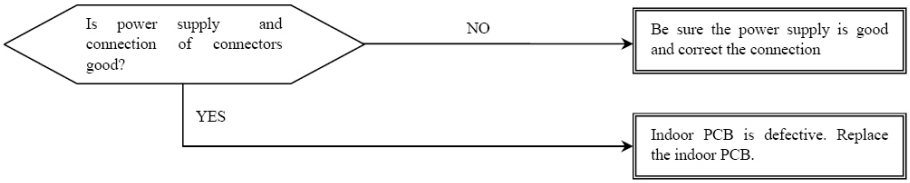
EO: EEPROM error



E1: Outdoor communication error


Disconnect the power supply, after 1 minute, connect the power supply, turn on the unit with remote controller
Does the unit work normally?
NO
Check the wiring between indoor and outdoor unit. Is the connection of L, N, S and GND good? Is the GND connection on outdoor PCB good?
NO
Reconnect and retest again
Yes
Is the LED4 (red) on outdoor PCB bright and LED1(yellow) blinking?
Yes
Replace indoor PCB and repower on. Is the failure cleared?
No
The power supply for outdoor PCB is fail. Check the wiring on outdoor PCB comparing with wiring plate. Is the connection good?
Yes
No
Correct the connection.
Replace outdoor e-box.

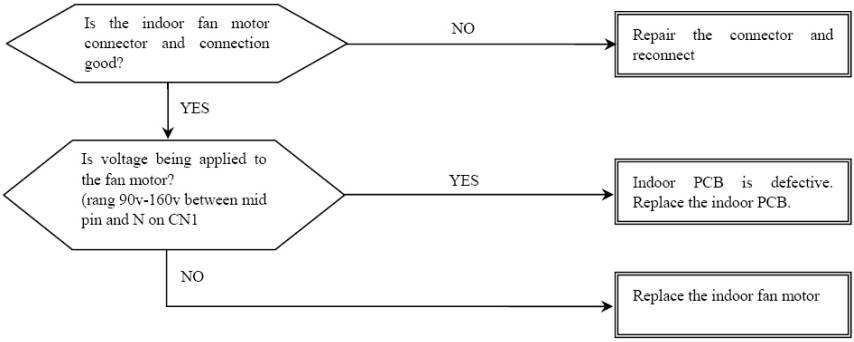
E2: Zero-crossing signal error


Is power supply and connection of connectors good?
NO
Be sure the power supply is good and correct the connection
YES
Indoor PCB is defective. Replace the indoor PCB.

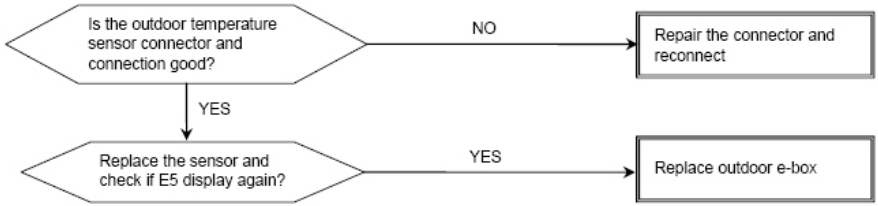
ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

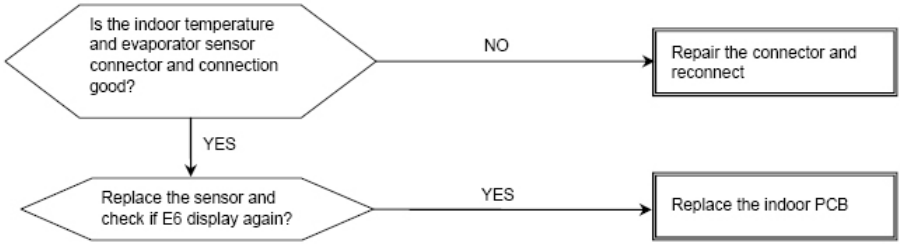
E3: Fan speed out of control


Is the indoor fan motor connector and connection good?
NO
Repair the connector and reconnect
YES
Is voltage being applied to the fan motor? (rang 90v-160v between mid pin and N on CN1
YES
Indoor PCB is defective. Replace the indoor PCB.
NO
Replace the indoor fan motor

E5: Open or short circuit of outdoor temperature sensor


Is the outdoor temperature sensor connector and connection good?
NO
Repair the connector and reconnect
YES
Replace the sensor and check if E5 display again?
YES
Replace outdoor e-box

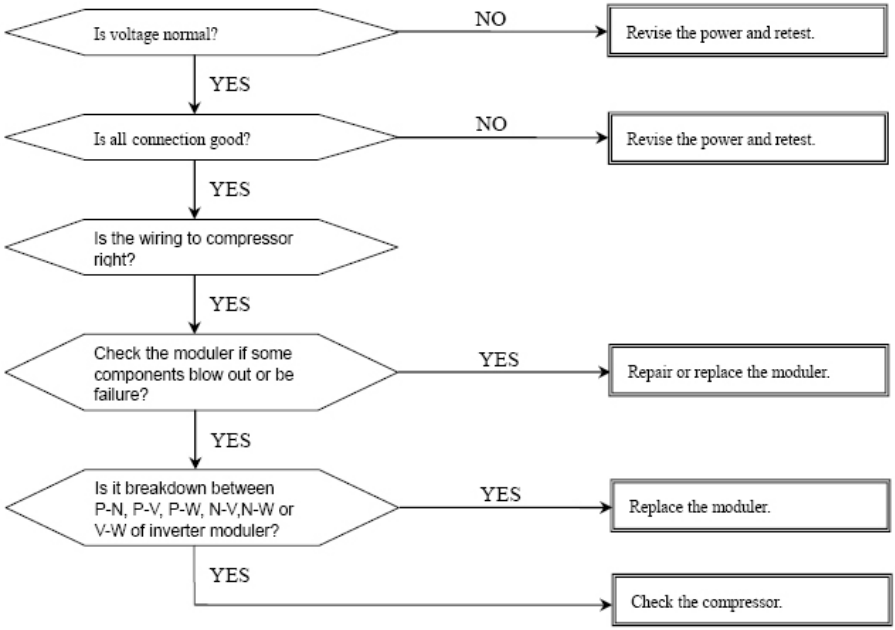
E6: Open or short circuit of room or evaporator temperature sensor


Is the indoor temperature and evaporator sensor connector and connection good?
NO
Repair the connector and reconnect
YES
Replace the sensor and check if E6 display again?
YES
Replace the indoor PCB

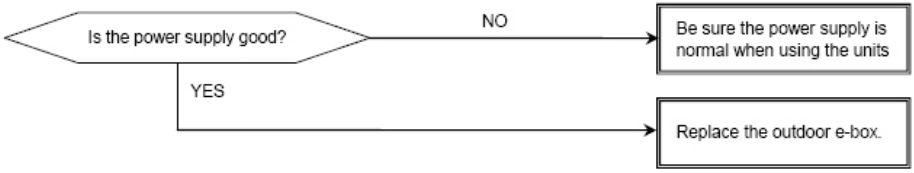
ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

Po: Inverter module protection



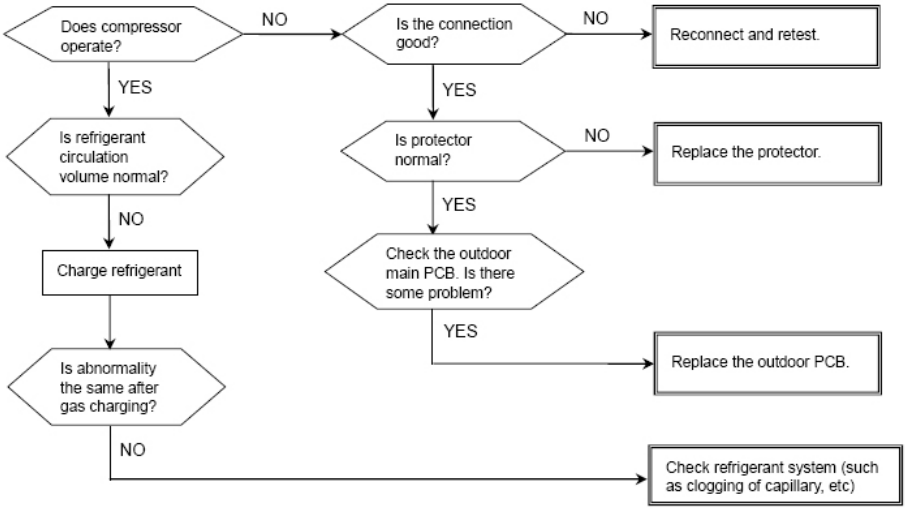
P1: Over voltage or too low voltage protection



ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

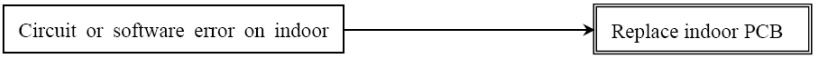
P2: Temperature protection of compressor top



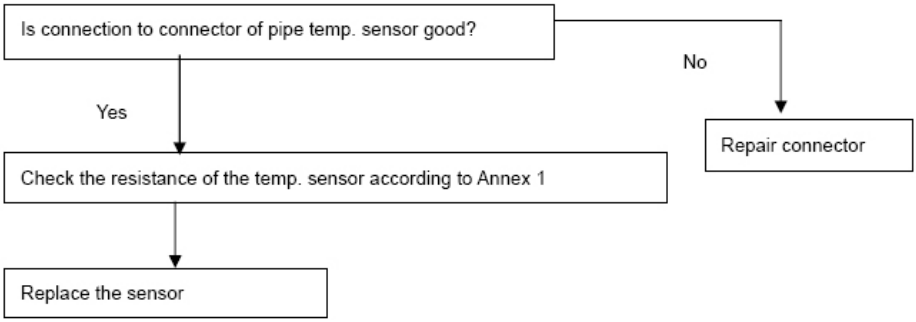
P3: Compressor current protection (same as Outdoor compressor current protection)

6.2 OUTDOOR UNIT

EO: EEPROM error



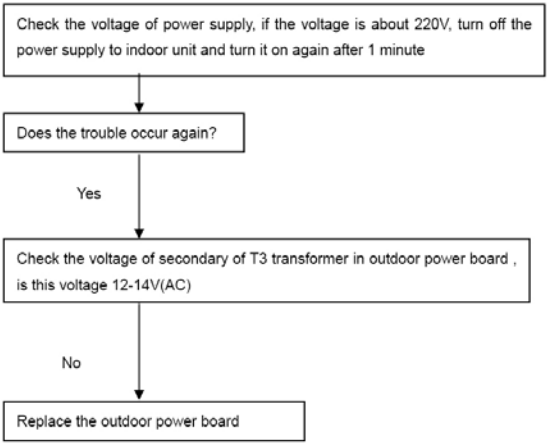
E1, E2, E3, E6, E4: Indoor or outdoor units pipe temp. sensor or connector of pipe temp. sensor is


Is connection to connector of pipe temp. sensor good?
No
Yes
Repair connector
Check the resistance of the temp. sensor according to Annex 1
Replace the sensor

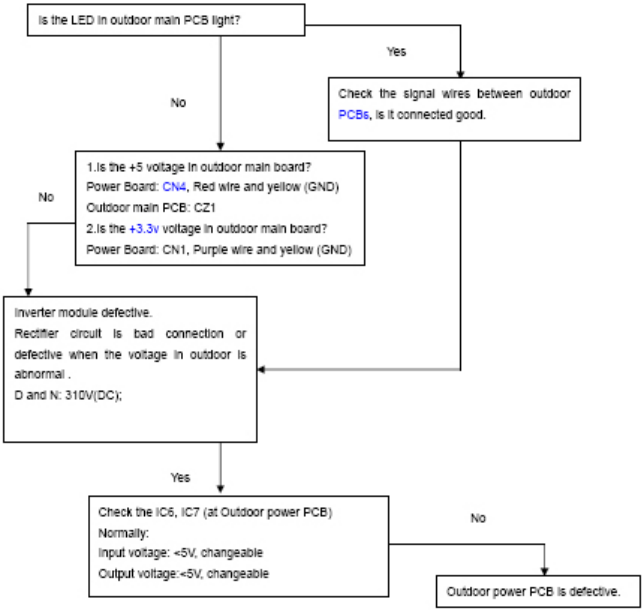
ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

E5: Voltage protection of compressor


Check the voltage of power supply, if the voltage is about 220V, turn off the power supply to indoor unit and turn it on again after 1 minute
Does the trouble occur again?
Yes
Check the voltage of secondary of T3 transformer in outdoor power board , is this voltage 12-14V(AC)
No
Replace the outdoor power board

E7: Indoor and outdoor communication error


Is the LED in outdoor main PCB light?
Yes
No
Check the signal wires between outdoor PCBs, is it connected good.
1.Is the +5 voltage in outdoor main board?
Power Board: CN4, Red wire and yellow (GND)
Outdoor main PCB: CZ1
2.Is the +3.3v voltage in outdoor main board?
Power Board: CN1, Purple wire and yellow (GND)
No
Inverter module defective.
Rectifier circuit is bad connection or defective when the voltage in outdoor is abnormal .
D and N: 310V(DC);
Yes
Check the IC6, IC7 (at Outdoor power PCB)
Normally:
Input voltage: <5V, changeable
Output voltage:<5V, changeable
No
Outdoor power PCB is defective.

Outdoor unit display	LED STATUS
P0	Compressor top protection against temperature

Off: 105c; On: 90c

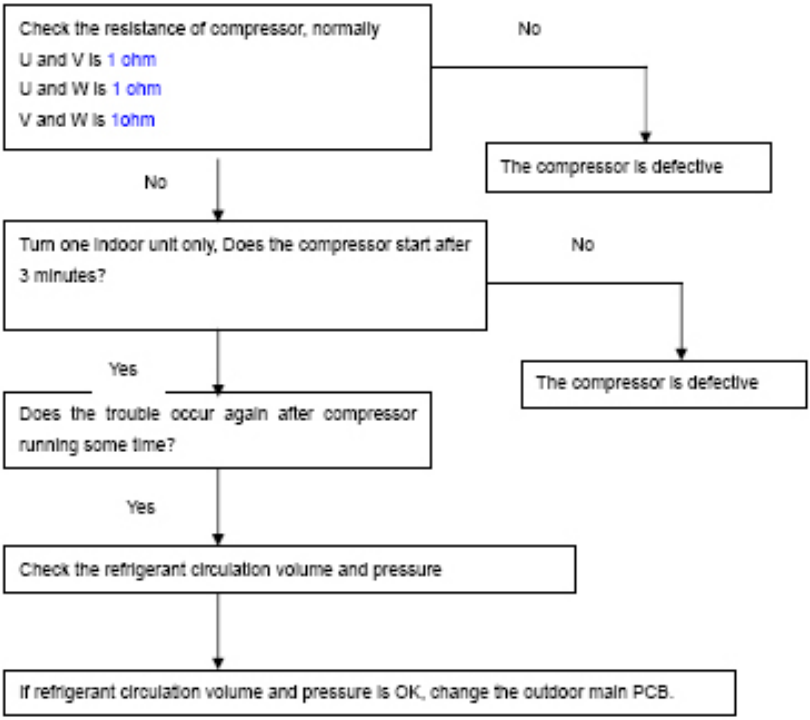
The trouble shooting is same with the one of indoor unit P2 protection.

ENG

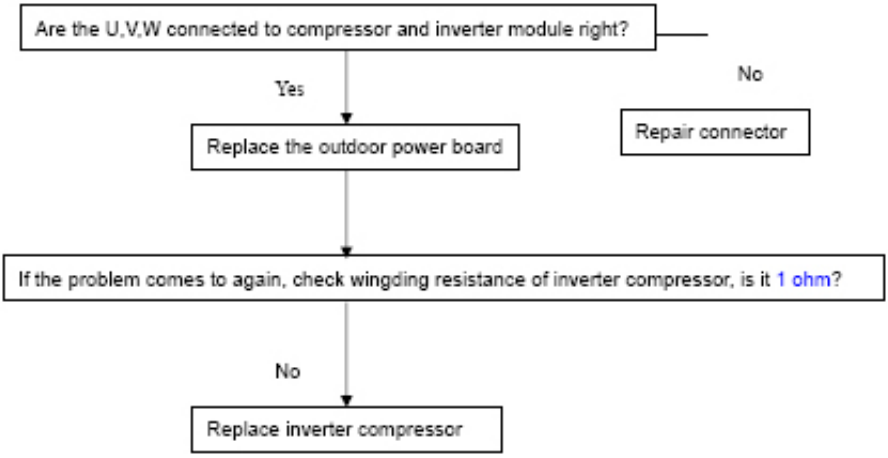
6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

Po: Compressor top protection against temperature (same as indoor unit P2 protection)

P3: Compressor current protection


Check the resistance of compressor, normally
U and V is 1 ohm
U and W is 1 ohm
V and W is 1ohm
No
The compressor is defective
No
Turn one indoor unit only, Does the compressor start after 3 minutes?
No
The compressor is defective
Yes
Does the trouble occur again after compressor running some time?
Yes
Check the refrigerant circulation volume and pressure
If refrigerant circulation volume and pressure is OK, change the outdoor main PCB.

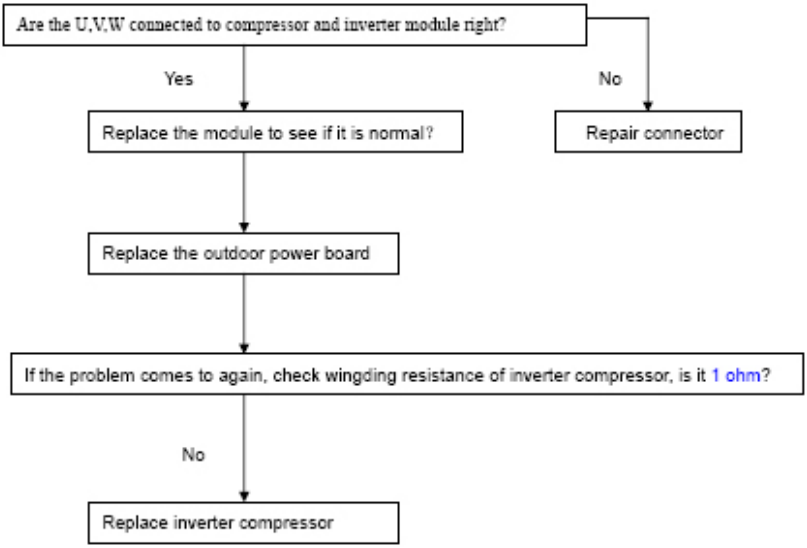
P4: Inverter module protection (drive protection arose)


Are the U,V,W connected to compressor and inverter module right?
No
Yes
Repair connector
Replace the outdoor power board
If the problem comes to again, check wingding resistance of inverter compressor, is it 1 ohm?
No
Replace inverter compressor

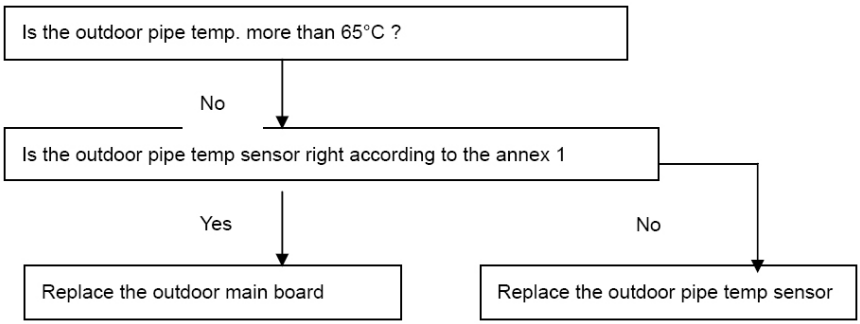
ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

P4 (LED flashes nine times): Inverter module protection (module protection arose)


Are the U,V,W connected to compressor and inverter module right?
Yes
No
Replace the module to see if it is normal?
Repair connector
Replace the outdoor power board
If the problem comes to again, check wingding resistance of inverter compressor, is it 1 ohm?
No
Replace inverter compressor

P6: Condenser high-temperature protection.
When outdoor pipe temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.


Is the outdoor pipe temp. more than 65°C ?
No
Is the outdoor pipe temp sensor right according to the annex 1
Yes
No
Replace the outdoor main board
Replace the outdoor pipe temp sensor

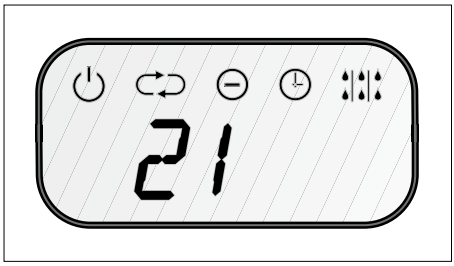
ENG

7- PCB EXPLANATION

7.1 ELECTRIC CONTROL WORKING ENVIRONMENT

-Input voltage: 175~253V.
-Input power frequency:50Hz.
-Indoor fan normal working amp. is less than 1A.
-Outdoor fan. Normal working amp. is less than 1.5A.
-Four-way valve normal working amp. is less than 1A.
-Swing motor: DC12V.

7.2 DISPLAY FUNCTION



Run indicator
Flash at 0.5Hz when the unit is standby. Illuminate when the unit is turned on.

Auto indicator
This indicator illuminates when the air conditioner is in AUTO operation.

Ion indicator
Illuminate when Ionizer/Plasma function is activated.

Timer indicator
This indicator illuminates when TIMER is set ON/OFF.

DEF. Indicator
This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.

Temperature indicator
Usually it displays the temperature settings. When change the setting temperature, this indicator begins to flash, and stops 20 seconds later. It displays the room temperature when the air conditioner is in FAN only operation, and the range of that is 0~50. When the unit stops operation, it returns to original factory settings. It will also display the error codes when malfunction or protection happen.

Frequency indicator
This indicator appears only when the compressor is in operation and indicates the current operating frequency.

LED display control function.
Pressing "LED display" button on remote controller will turn off all displays on indoor unit, while pressing once again, all displays will resume.

7.3 OUTDOOR UNIT'S DIGITAL DISPLAY TUBE

There is a digital display tube in outdoor PCB.

Digital display tube display function
• In standby , The LED displays the number of indoor units.
• In compressor operation, the LED display the frequency.
• In defrosting mode, The LED displays "dF"
• In compressor pre-heating, The LED displays "1 1"
• In protection or malfunction, the LEC displays error code or protection code.

7- PCB EXPLANATION

7.4 OUTDOOR UNIT POINT CHECK FUNCTION

There is a check switch in outdoor PCB.
Push the switch SW1 to check the states of unit when the unit is running. The digital display tube will display the follow procedure when push SW1 each time:

	Display	Remark
1	Indoor unit capacity demand code	
2	Outdoor unit running mode code	Off:0, Cooling:1, Heating:2
3	Amendatory capacity demand code	
4	Outdoor unit fan motor state	Off:0, Low speed:1, High speed:2
5	Evaporator outlet temp. for 1# indoor unit	Actual data
6	Evaporator outlet temp. for 2# indoor unit	Actual data
7	Evaporator outlet temp. for 3# indoor unit	Actual data
8	Evaporator outlet temp. for 4# indoor unit	Actual data
9	Condenser pipe temp.	Actual data
10	Ambient temp.	Actual data
11	Compressor discharge temp.	Actual data
12	Inverter current	Actual data
13	EXV open angle for 1# indoor unit	Actual data×8
14	EXV open angle for 2# indoor unit	Actual data×8
15	EXV open angle for 3# indoor unit	Actual data×8
16	EXV open angle for 4# indoor unit	Actual data×8
17	Indoor unit number	The indoor unit can communicate with outdoor unit well.
18	The last error or protection code	00 means no malfunction
19	—	Check point over

Frequency of compressor:

Display	Frequency of compressor (Hz)
30	30
--	Stand by
60	60

Running mode:

Display	Corresponding mode
0	Off
1	Cooling mode
2	Heating mode

Capacity demand:

Cooling mode

Capacity	2000-2500	2000-2500	3000-3800	4500-5000	5000-5500	5500-6100	6100-7000	7000-7500	7500-8000	7500-8000
Corresponding Code	1	2	3	4	5	6	7	8	9	›=10

Heating mode

Capacity	2000-2500	2000-2500	3000-3800	4500-5000	5500-6100	6100-7000	6100-7000	7000-7500	7500-8000	8000-8900
Corresponding Code	1	2	3	4	5	6	7	8	9-10	›=11

Note: The capacity is just for reference.

ENG

7- PCB EXPLANATION

Number of indoor unit

Display	Number of indoor unit
1	1
2	2
3	3

Outdoor ambient temp:

Display	Corresponding temp.	Display	Corresponding temp.	Display	Corresponding temp.
15	-7.5	50	10	80	25
16	-7	51	10.5	81	25.5
17	-6.5	52	11	82	26
18	-6	53	11.5	83	26.5
19	-5.5	53	11.5	84	27
20	-5	54	12	85	27.5
21	-4.5	55	12.5	86	28
22	-4	56	13	87	28.5
23	-3.5	57	13.5	88	29
24	-3	58	14	89	29.5
26	-2	59	14.5	90	30
27	-1.5	60	15	91	30.5
28	-1	61	15.5	92	31
29	-0.5	62	16	93	31.5
30	0	63	16.5	93	31.5
31	0.5	63	16.5	94	32
32	1	64	17	95	32.5
33	1.5	65	17.5	96	33
34	2	65	17.5	97	33.5
35	2.5	66	18	98	34
36	3	67	18.5	99	34.5
37	3.5	68	19	10.	35~40
38	4	69	19.5	11.	40~45
39	4.5	70	20	12.	45~50
40	5	71	20.5	13.	50~55
41	5.5	72	21	14.	55~60
42	6	73	21.5	15.	60~65
43	6.5	74	22	16.	65~70
44	7	75	22.5		
45	7.5	75	22.5		
46	8	76	23		
47	8.5	77	23.5		
48	9	78	24		
49	9.5	79	24.5		

Current of outdoor unit

Display	Corresponding mode
44	6.0 A
46	6.2 A
54	7.4 A
55	7.6 A

58	7.6 A
62	8.0 A
66	8.6 A
67	8.8 A
68	9.0 A
70	9.2 A
72	9.5 A
76	10.0 A
78	10.2 A
80	10.4 A
82	10.6 A
84	11.0 A
88	11.6 A
92	12.0 A
94	12.2 A

-No. 1 opening degree of electronic expansion valve:
Opening degree equals the display data times 8
-No. 2 opening degree of electronic expansion valve:
Opening degree equals the display data times 8
-No. 3 opening degree of electronic expansion valve:
Opening degree equals the display data times 8

7.5 PROTECTION

-3 minutes delay at restart for compressor.

-Discharge temperature protection of compressor, compressor stops when the temp. of discharge is more than 115 and last out 10 s. compressor runs when the temp. of discharge is less than 90 .

-Temperature protection of compressor top, compressor stops when the temp. of top of compressor is more than 120 , compressor runs when the temp. of top of compressor is less than 105 .

-When AC voltage 265V for 30 seconds, Outdoor Unit stops operation and alarms. When AC voltage 265V for 30 seconds, Outdoor Unit resumes operation.

-Inverter module Protection , Inverter module Protection itself has a protection function against current, voltage and temperature.

-Sensor protection at open circuit and breaking disconnection

-Fan Speed is out of control. When Indoor Fan Speed is too high(higher than High Fan+300RPM)or too low(lower than 400RPM), the unit stops and LED displays failure information and can't return to normal operation automatically.

-Cross Zero signal error warning. If there is no Cross Zero signals in 4 minutes, the unit stops and LED displays failure information and can't return to normal operation automatically.

-Current protection: When the current is more than 'X' A, the compressor stops.
(X is 7A for 14K 1x2 unit, is 14A for 18K 1x2 unit, is 13.5A for 21 1x3 unit, is 15A for 27K 1x3 unit, is 16A for 27K 1x4 unit and is 21.5A for 36K 1x4 unit.)

-Outdoor condenser high temperature protection: Under cooling mode, if T3>65 for 3 minutes, the compressor will stop. When T3<52 , the protection is not valid.

-Pressure protection (just be available for 27K and 36K 1x4 unit): If low pressure is lower 0.03MPa, the compressor will stop and when low pressure is higher than 0.10MPa, the compressor will restart. If high pressure is higher than 3.3MPa,

the compressor will stop and when high pressure is lower than 2.4MPa, the compressor will restart.

-Compressor pre-heating function: When the outdoor temperature is lower than 3 and the compressor stops operation for more than 3 hours, or the outdoor temperature is lower than 3 and the power is just put on, the compressor enters into pre-heating condition. When outdoor temp. is more than 5 or user operate it, pre-heating condition will finish.

7.6 FAN-ONLY MODE

Fan speed is high/mid/low/ Auto

7.7 COOLING MODE

-Indoor fan keeps running, fan speed can be set in high/mid/low/ Auto:
-Auto fan at cooling mode: (T=Indoor Temp.-Setting Temp.)

	Condition	Indoor fan speed
Room temp. up		
	T<1.5	Low
	1.5 <T<4	Mid.
	T>4	High
Room temp. down	T> 3	High
	1 <T<3	Mid.
	T<1	Low

-Anti-freezing control to indoor evaporator at cooling mode (T: evaporator temp.)

Evaporator Temp.	Compressor
T< 4	Off
T > 8	On

7.8 DEHUMIDIFYING MODE

-The indoor fan is fixed in low speed
-Low room temperature protection:
When room temperature decreases to below 10ºC, indoor fan stop, when room temperature restores to over 12ºC, indoor fan start.
-At dehumidifying mode, the anti-freezing function of the indoor heat exchanger is the same as that of cooling mode.

7.9 HEATING MODE

-Indoor Fan actions at heating mode

Indoor Fan can be set at HIGH/MID/LOW/AUTO by using a remote controller, but

Anti-cold wind function prevails.

Anti-cold wind control function at heating mode

	Condition T= Indoor exchanger temp.	Indoor fan speed
Indoor exchanger temp. up	T<34	Off
	34 <T<37	Breeze
	37 <T<44	Low speed
	T> 44	Setting fan speed
Indoor exchanger temp. down	T> 38	Setting fan speed
	33 <T<38	Low speed
	24 <T<33	Breeze
	T<24	Off

7- PCB EXPLANATION

Auto wind at heating mode

	Condition T=Indoor Temp.-Setting Temp.	Indoor fan speed
Room temp. up	T<1.5	High
	1.5 <T<2.5	Mid.
	T>2.5	Low
Room temp. down	T<1.0	High
	1.0 <T<2.0	Mid.
	T>2.0	Low

Indoor evaporator high-temperature protection at heating mode

Condition T= Indoor exchanger temp.	Compressor
T<48	On
53 <T<63	Decrease frequency of compressor
T>63	Off

Defrosting operation (Available for heating only).

7.10 DEFROST

-Defrosting condition: The temperature of outdoor heat exchanger remains consecutively lower than -2°c for more than 40 minutes,

-Ending condition of defrosting: If one of following conditions is satisfied, end the defrost and turn into heating mode:

a. The defrost time has reached to 10 minutes.

b. When the temperature of outdoor heat exchanger rises up to 15°C

-Defrosting Actions:

a. Compressor runs

b. 4 way valve switches off

c. Outdoor fan switches off

d. Indoor fan running according to anti-cold wind function in heating mode

7.11 AUTOMATIC OPERATION MODE

The air conditioner automatically selects one of the following operation modes: cooling, heating or fan only according to the temp. difference between room temp. (TA) and set temp. (TS).

TA—TS	Operation mode
TA—TS>2°c	Cooling
-1°c≤TA-TS≤+2°c	Fan-only
TA-TS<-1°c	Heating (air-only for cooling only type)

7.12 MANUAL SWITCH

-Mode changes when push this button .

Cooing mode Auto mode Unit off Cooing mode

-At Cooing mode, after 30 minutes cooling operation whose fan speed is set as low, the A/C operates with a setting temp. of 24 .

-At auto mode, the A/C operates with a set temp. of 24

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7.13 TIMER FUNCTION

-The maximum length of timer is 24 hours and the minimum resolving power is 15 minutes.
-Timer on: first turn off the A/C, the A/C will be automatically on at the set time.
-Timer off: first turn on the A/C, the A/C will be automatically off at the set time
-Timer on/off function(on time is earlier than off time): first turn off the A/C, it will be automatically on at set time, and later be off at the set time, then unit turns on at set time.
-Timer off/on function(off time is earlier than on time): first turn on the A/C, it will be automatically off at set time, and later be on at the set time, then unit turns off at set time.

7.14 SLEEP MODE

-It is available at cooling, heating or auto mode.
-Cooling: The set temperature rise 1ºC per hour. Two hours later, the set temperature will maintain as a constant and the fan speed is kept at low speed.
-Heating: The set temperature decrease 1ºC per hour. Two hours later, the set temperature will maintain as a constant and the air circulation is kept at low speed (Cold air proof function takes precedence over all).
-Auto: The Sleep Mode running function operates in accordance with selected running mode by auto mode.

-After 7 hours, unit cancels this mode automatically.

J2	On	On	Off	Off
J3	On	Off	On	Off
Stop time	7 hours	8 hours	6 hours	7 hours

-Auto restart function: In case of a sudden power failure, this function automatically sets the unit to previous settings before the power failure when power returns.

7.15 MODE CONFLICT

The indoor units can not work cooling mode and heating at same time. Heating mode has a priority.

Definition

	Cooling mode	Heating Mode	Fan	Off
Cooling mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

No: No mode conflict
Yes: Mode conflict

-Unit action

• In case of one Indoor unit working in cooling mode or fan mode, and another indoor unit is set to heating mode, the indoor unit working in cooling mode or fan mode will change to stand by. The outdoor unit will work in heating mode.
• In case of one Indoor unit working in heating mode, and another indoor unit is set to cooling mode or fan mode, the indoor unit setting to cooling mode or fan mode will change to stand by.

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CHARACTERISTIC OF TEMPERATURE SENSOR

Temp.	Resistance K	Temp.	Resistance K	Temp.	Resistance K
-10	62.2756	17	14.6181	44	4.3874
-9	58.7079	18	13.918	45	4.2126
-8	56.3694	19	13.2631	46	4.0459
-7	52.2438	20	12.6431	47	3.8867
-6	49.3161	21	12.0561	48	3.7348
-5	46.5725	22	11.5	49	3.5896
-4	44	23	10.9731	50	3.451
-3	41.5878	24	10.4736	51	3.3185
-2	39.8239	25	10	52	3.1918
-1	37.1988	26	9.5507	53	3.0707
0	35.2024	27	9.1245	54	2.959
1	33.3269	28	8.7198	55	2.8442
2	31.5635	29	8.3357	56	2.7382
3	29.9058	30	7.9708	57	2.6368
4	28.3459	31	7.6241	58	2.5397
5	26.8778	32	7.2946	59	2.4468
6	25.4954	33	6.9814	60	2.3577
7	24.1932	34	6.6835	61	2.2725
8	22.5662	35	6.4002	62	2.1907
9	21.8094	36	6.1306	63	2.1124
10	20.7184	37	5.8736	64	2.0373
11	19.6891	38	5.6296	65	1.9653
12	18.7177	39	5.3969	66	1.8963
13	17.8005	40	5.1752	67	1.830
14	16.9341	41	4.9639	68	1.7665
15	16.1156	42	4.7625	69	1.7055
16	15.3418	43	4.5705	70	1.6469

ANNEX

1. Reference voltage data:

a) Rectifier : Input :220-230V(AC), output :310V(DC)

b) Inverter module: U,V, W 3ph.

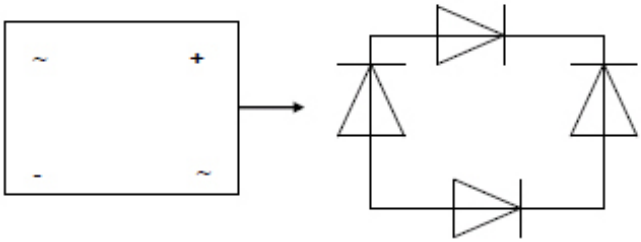
	Result
U-V	60-150V(AC)
U-W	60-150V(AC)
V-W	60-150V(AC)
P-N	DC 310V

c) Photo-couple PC817, PC851: Control side <+5V, AC side :< 24V(AC)

d) S terminal and N: changeable from 0-24V

2. Check the Diode Bridge component (In wiring diagram, rectifier)

Remark: If this part is abnormal, the LED will not light.



Multi-meter		Result	
		Forward Resistance	Backward Resistance
+	—	Infinite	Infinite
~	+	~500 ohm	Infinite
~			
-	~	~500 ohm	Infinite
	~		

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Saunier Duval reserves the right to modify specifications without prior notice.

VAM2-WN-TD 12/2009

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